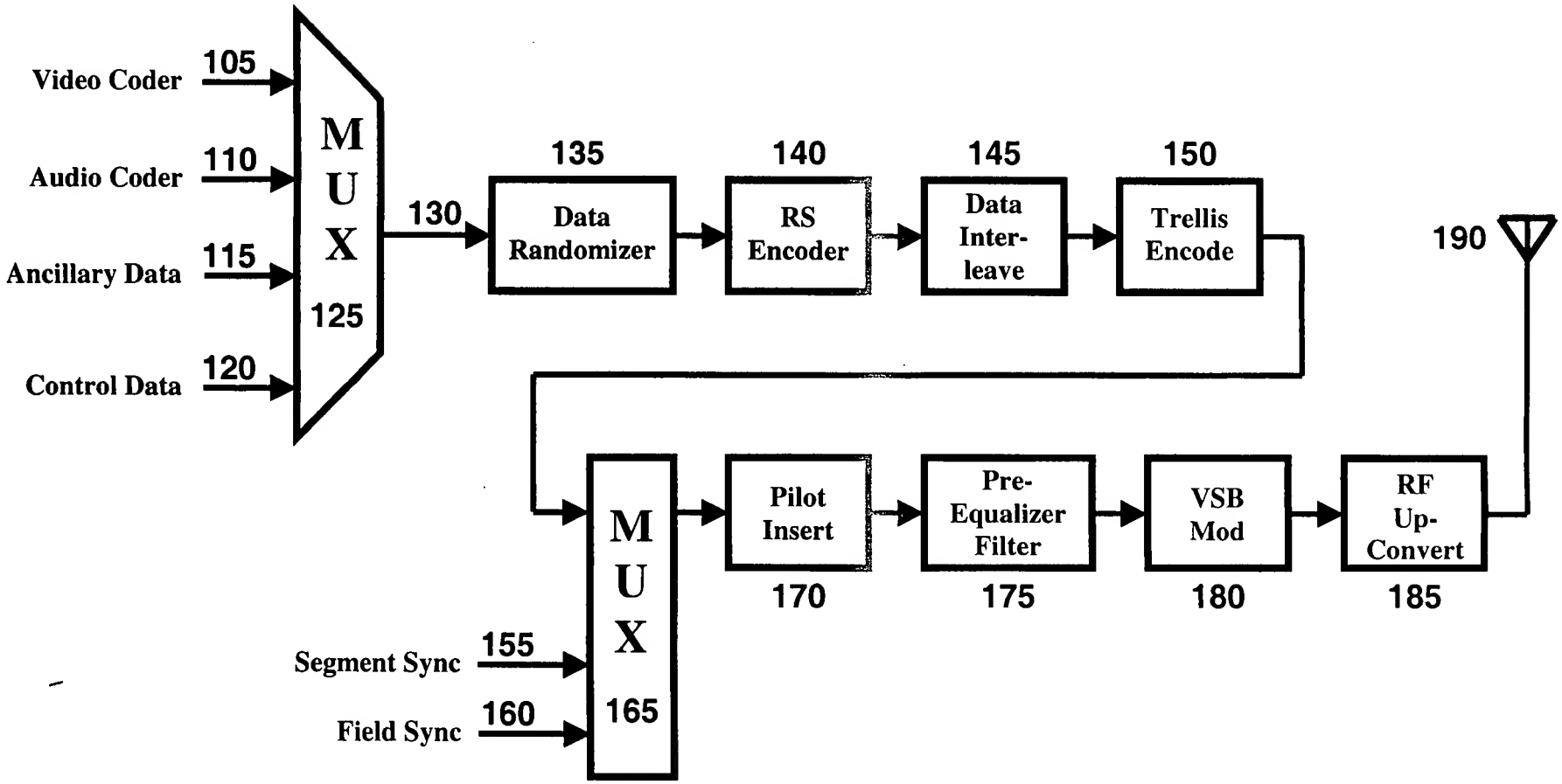

Video Coder
105
Audio Coder
110
Ancillary Data
115
Control Data
120
MUX
125
130
135
Data Randomizer
140
RS Encoder
145
Data Inter-leave
150
Trellis Encode
190
MUX
165
Segment Sync
155
Field Sync
160
Pilot Insert
170
Pre-Equalizer Filter
175
VSB Mod
180
RF Up-Convert
185

FIG. 1

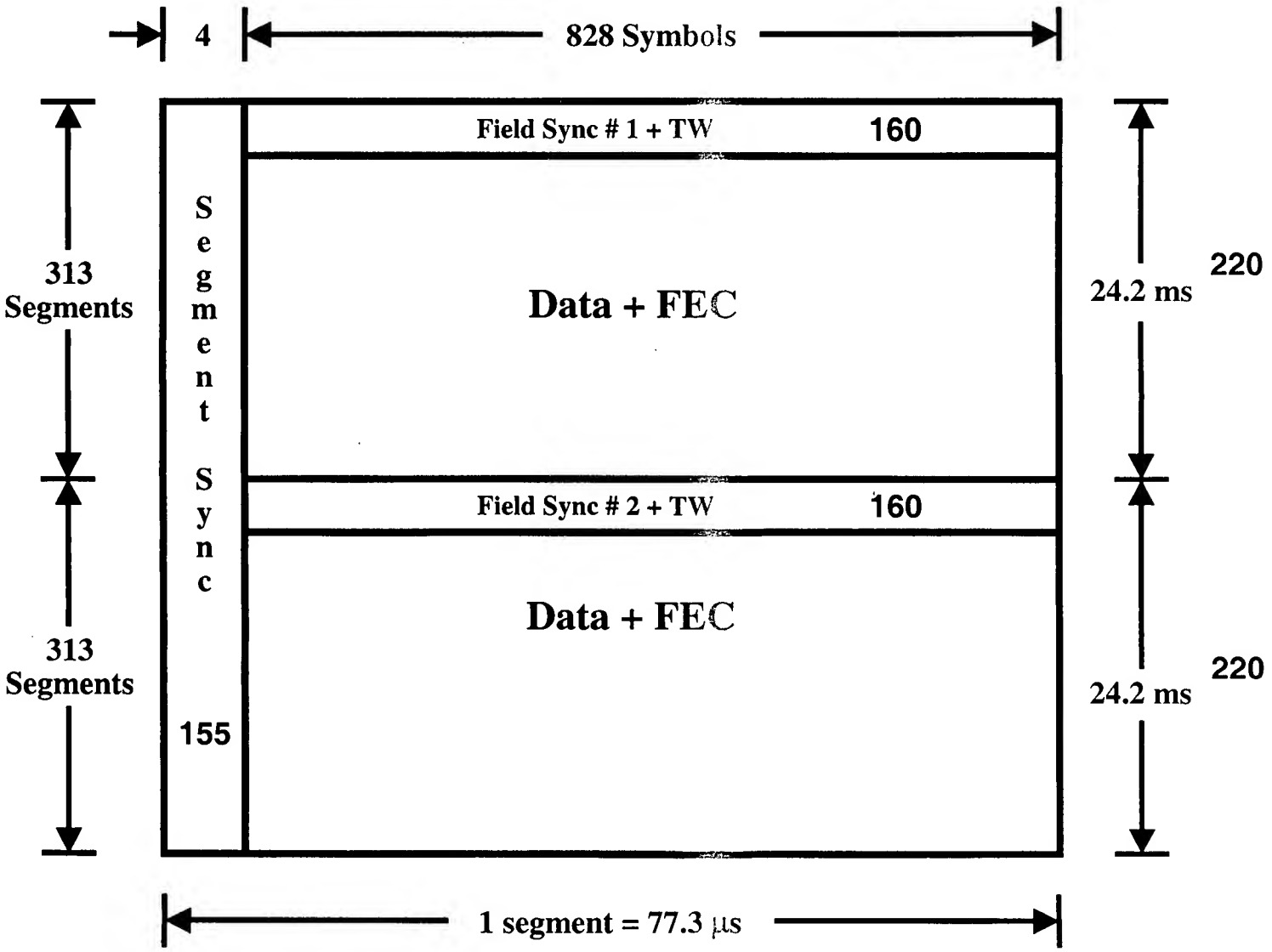

4
828 Symbols
313 Segments
Segment Sync
155
Field Sync # 1 + TW
160
Data + FEC
220
24.2 ms
Field Sync # 2 + TW
160
Data + FEC
313 Segments
220
24.2 ms
1 segment = 77.3 μs

FIG. 2

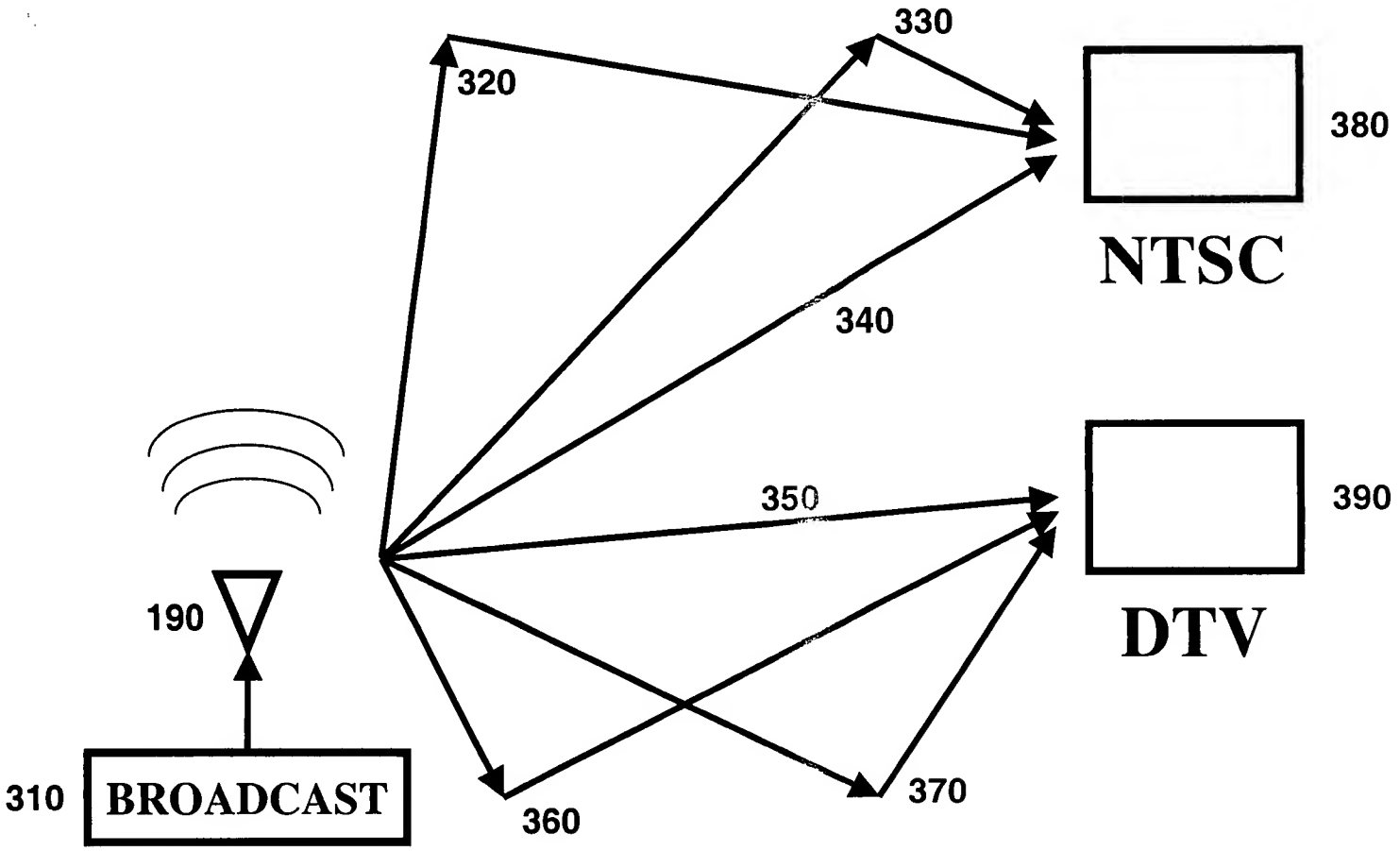


FIG. 3

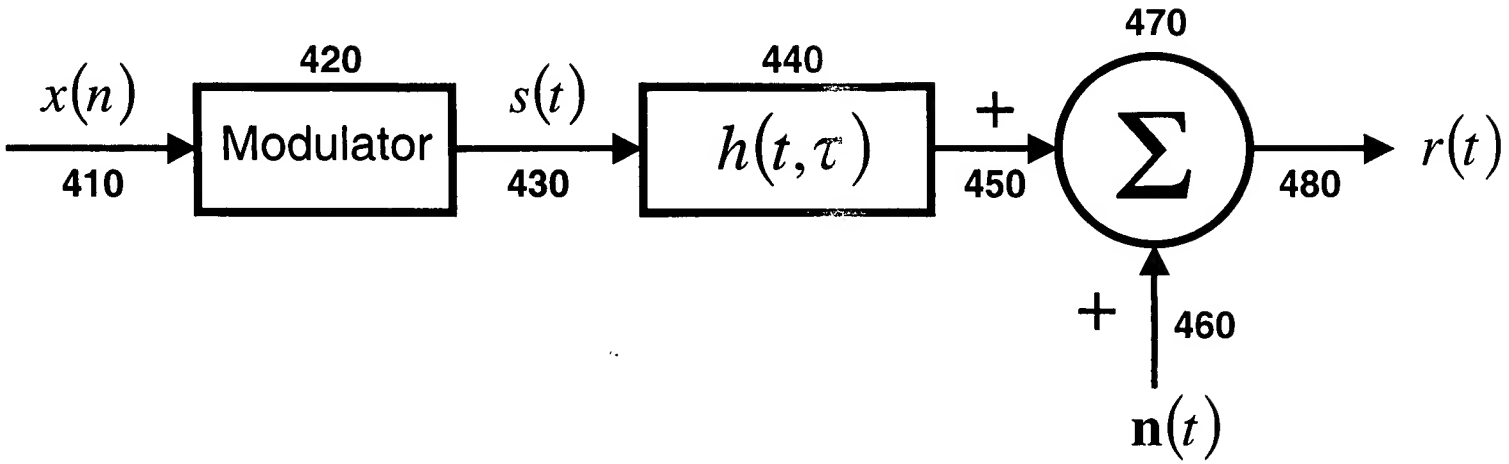


FIG. 4

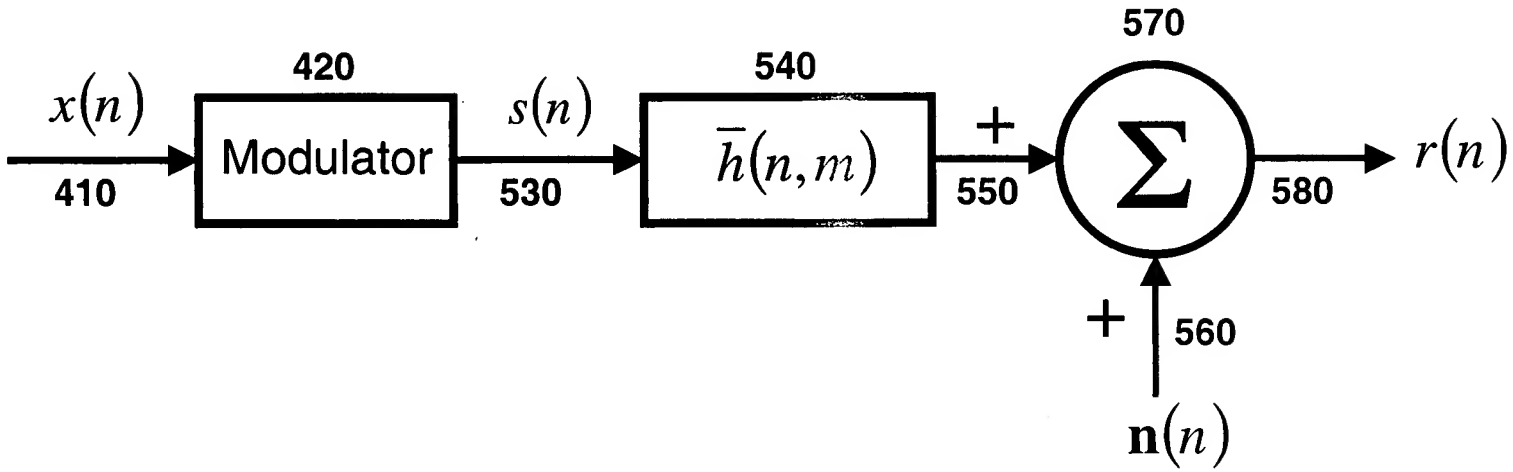

570
420
540
$x(n)$
Modulator
$s(n)$
$\bar{h}(n,m)$
+
Σ
$r(n)$
410
530
550
580
+
560
$\mathbf{n}(n)$

FIG. 5

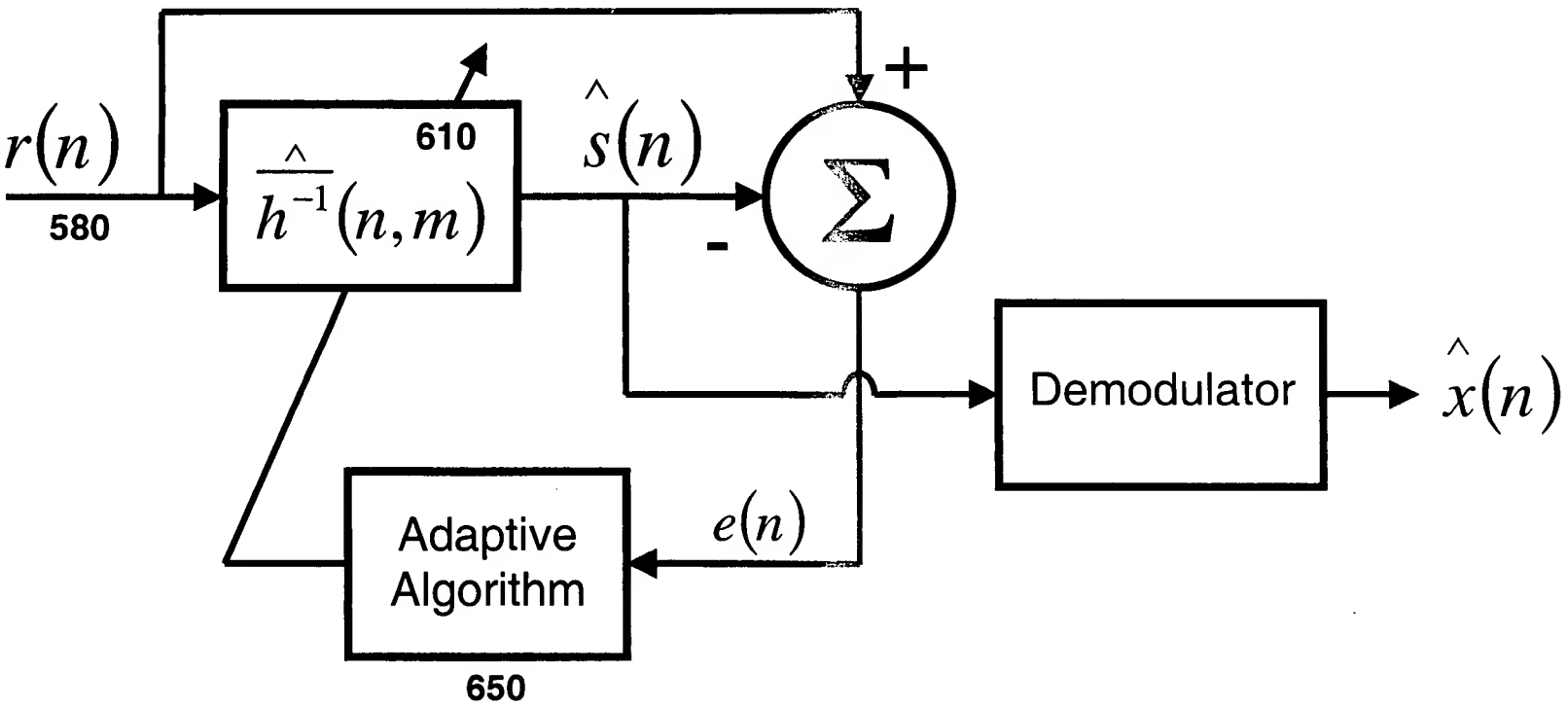

r(n)
580
610
$\hat{h}^{-1}(n,m)$
$\hat{s}(n)$
+
-
Σ
Demodulator
$\hat{x}(n)$
Adaptive Algorithm
650
e(n)

FIG. 6

TOE2nO" T84n4n86O

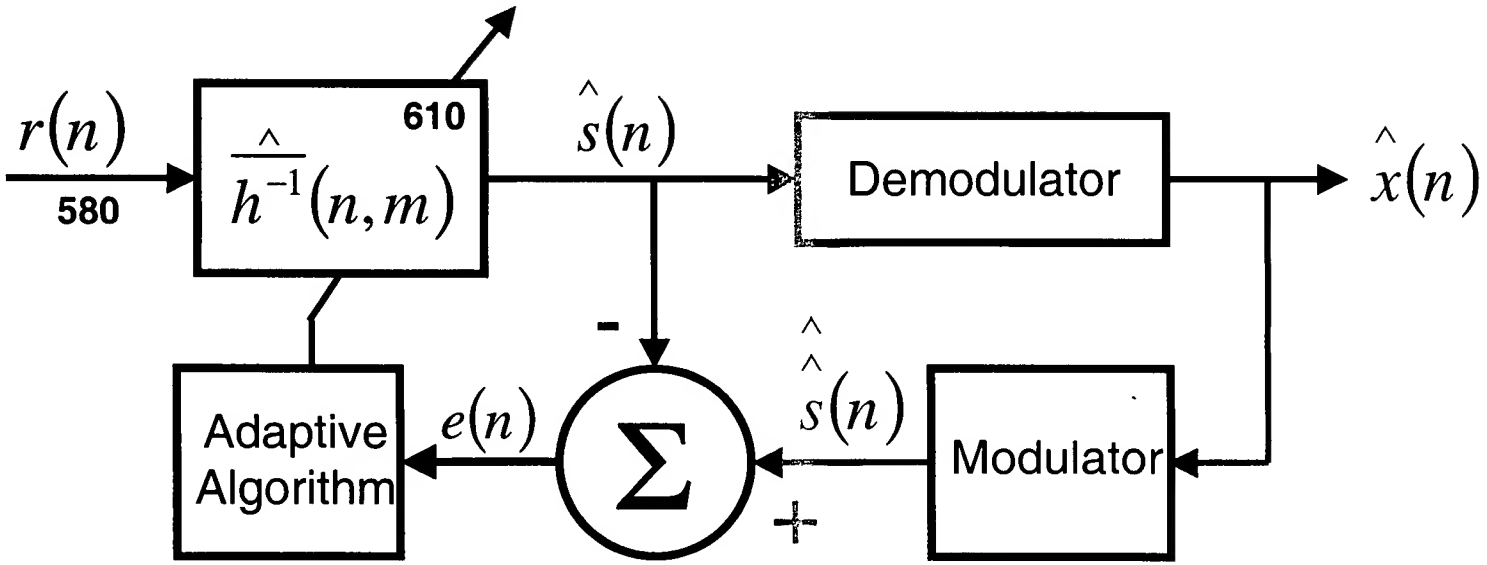


FIG. 7

TO2240 T8h0h860

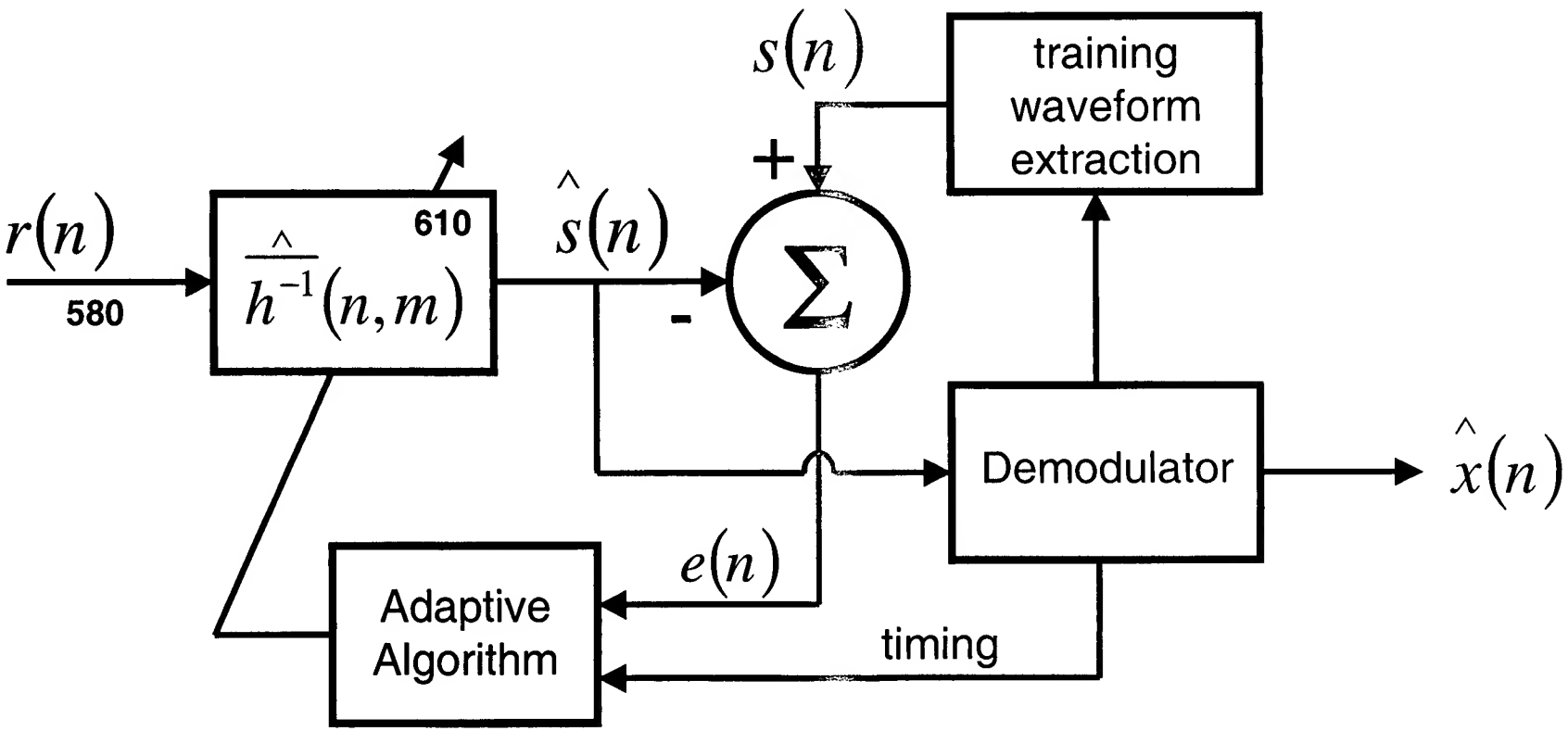


FIG. 8

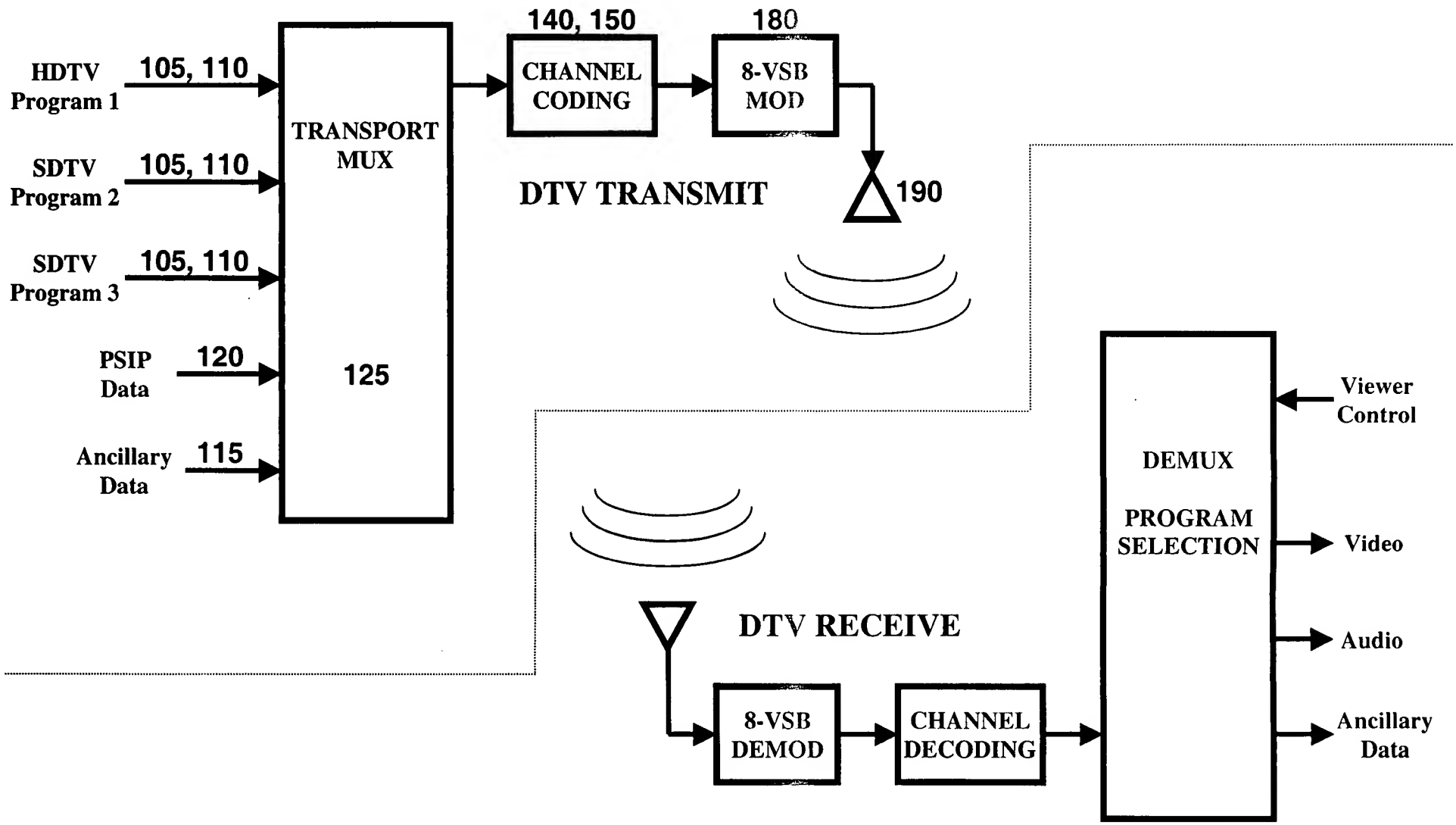

HDTV Program 1
105, 110
SDTV Program 2
105, 110
SDTV Program 3
105, 110
PSIP Data
120
Ancillary Data
115
TRANSPORT MUX
125
140, 150
CHANNEL CODING
180
8-VSB MOD
DTV TRANSMIT
190
DTV RECEIVE
8-VSB DEMOD
CHANNEL DECODING
DEMUX
PROGRAM SELECTION
Viewer Control
Video
Audio
Ancillary Data

FIG. 9

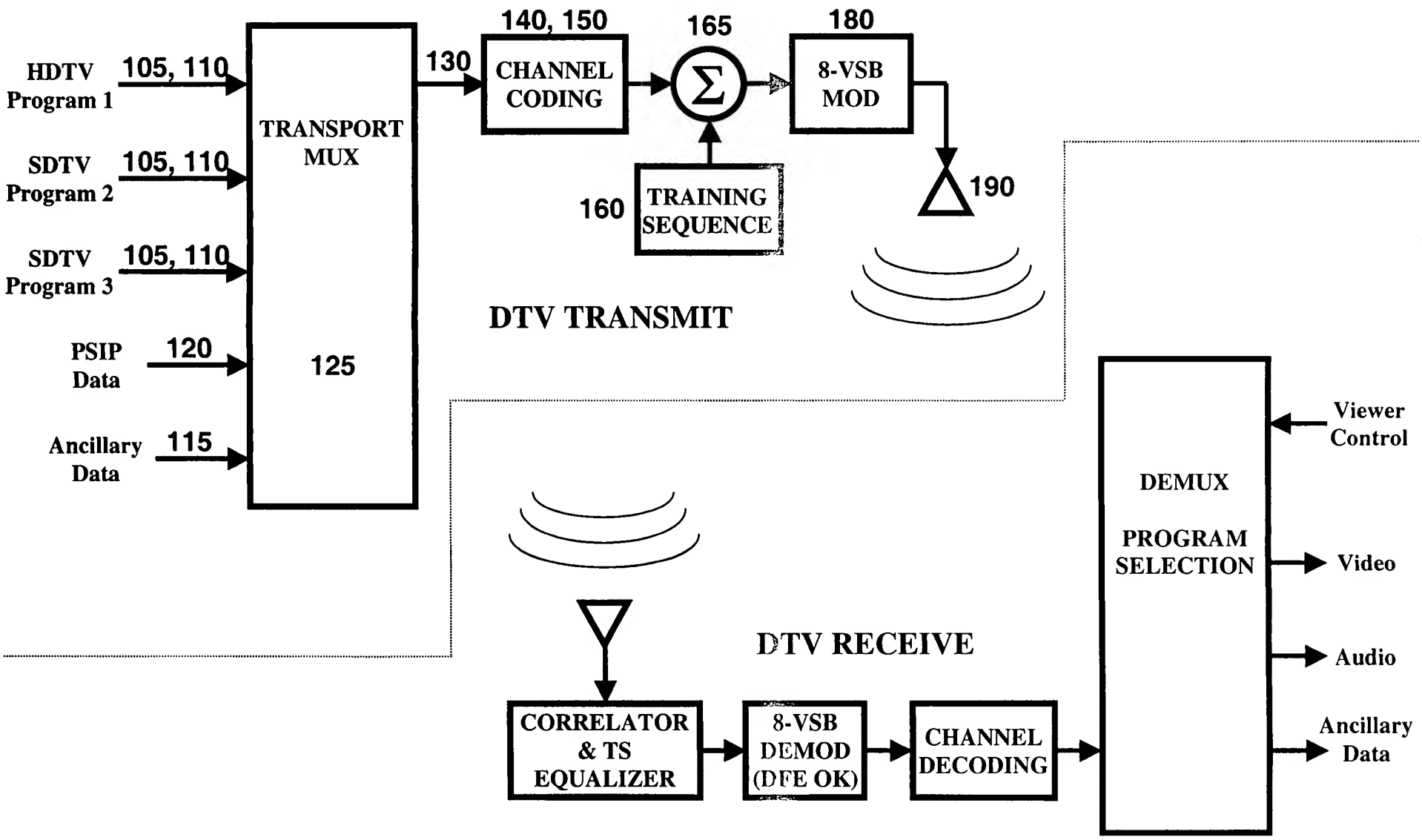

HDTV Program 1
105, 110
SDTV Program 2
105, 110
SDTV Program 3
105, 110
PSIP Data
120
Ancillary Data
115
TRANSPORT MUX
125
130
140, 150
CHANNEL CODING
165
180
8-VSB MOD
160
TRAINING SEQUENCE
190
DTV TRANSMIT
DTV RECEIVE
CORRELATOR & TS EQUALIZER
8-VSB DEMOD (DFE OK)
CHANNEL DECODING
DEMUX
PROGRAM SELECTION
Viewer Control
Video
Audio
Ancillary Data

FIG. 10

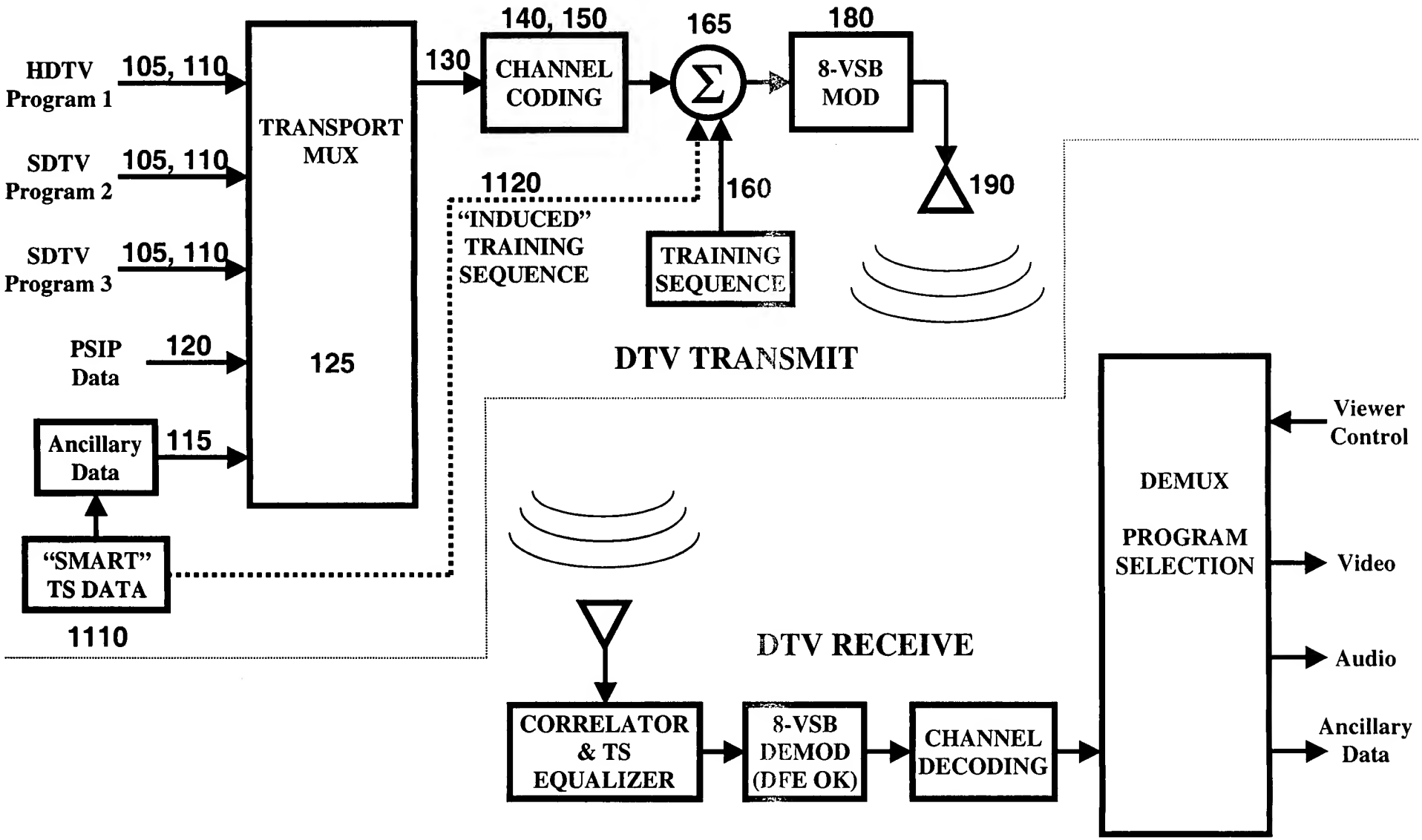

HDTV Program 1
105, 110
SDTV Program 2
105, 110
SDTV Program 3
105, 110
PSIP Data
120
Ancillary Data
115
"SMART" TS DATA
1110
TRANSPORT MUX
125
130
140, 150
CHANNEL CODING
165
180
8-VSB MOD
190
160
1120
"INDUCED" TRAINING SEQUENCE
TRAINING SEQUENCE
DTV TRANSMIT
DTV RECEIVE
CORRELATOR & TS EQUALIZER
8-VSB DEMOD (DFE OK)
CHANNEL DECODING
DEMUX
PROGRAM SELECTION
Viewer Control
Video
Audio
Ancillary Data

FIG. 11

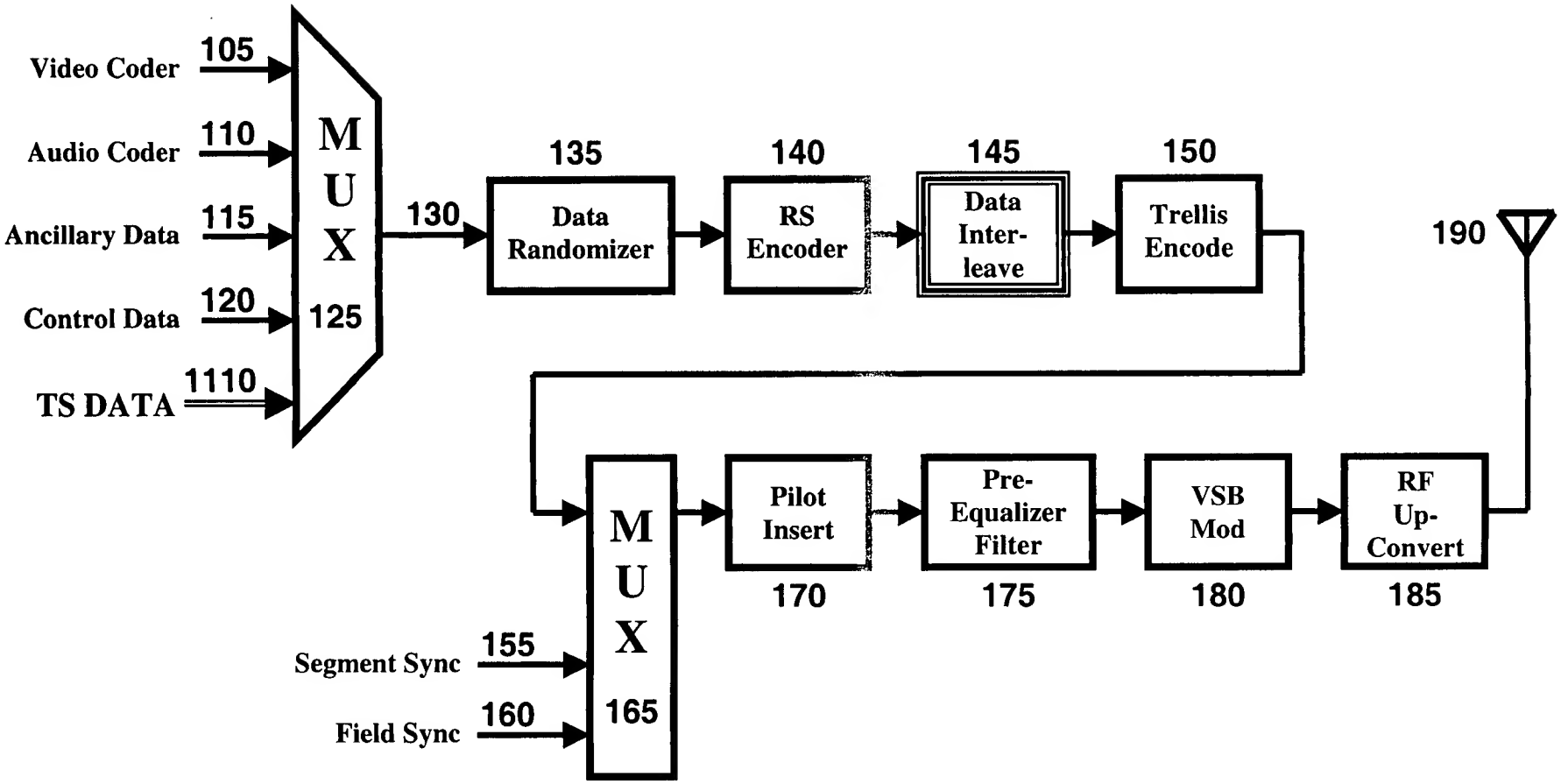
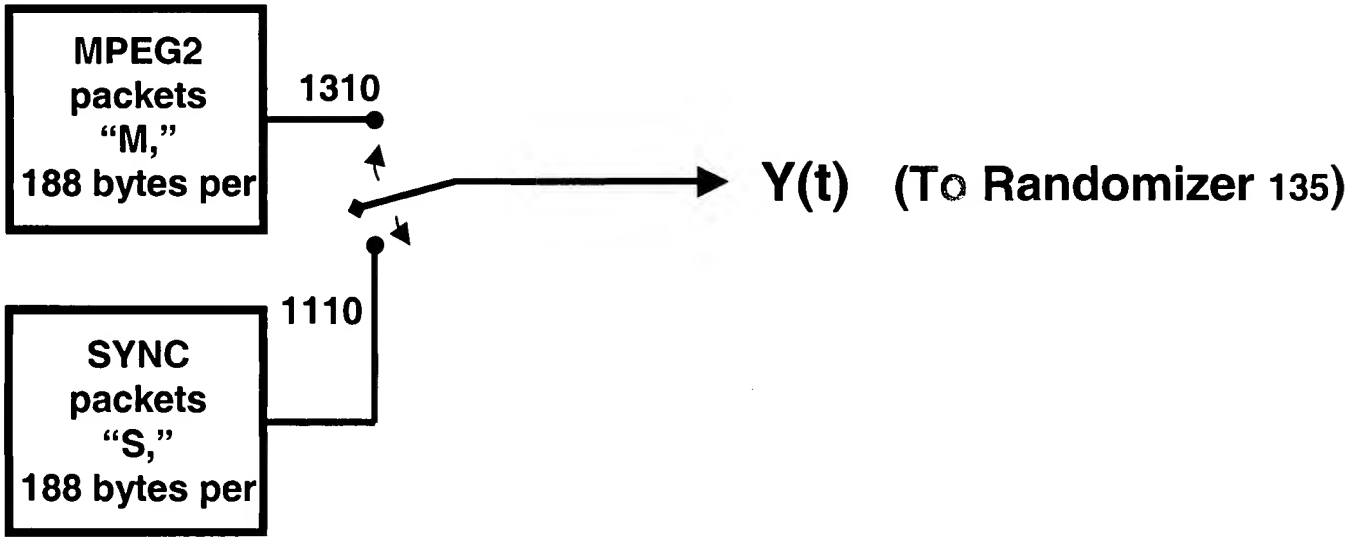

Video Coder
105
Audio Coder
110
Ancillary Data
115
Control Data
120
TS DATA
1110
MUX
125
130
135
Data Randomizer
140
RS Encoder
145
Data Inter-leave
150
Trellis Encode
190
MUX
165
Segment Sync
155
Field Sync
160
Pilot Insert
170
Pre-Equalizer Filter
175
VSB Mod
180
RF Up-Convert
185

FIG. 12

TOSHIBA TSB04860

EXAMPLE: 1 PER 13



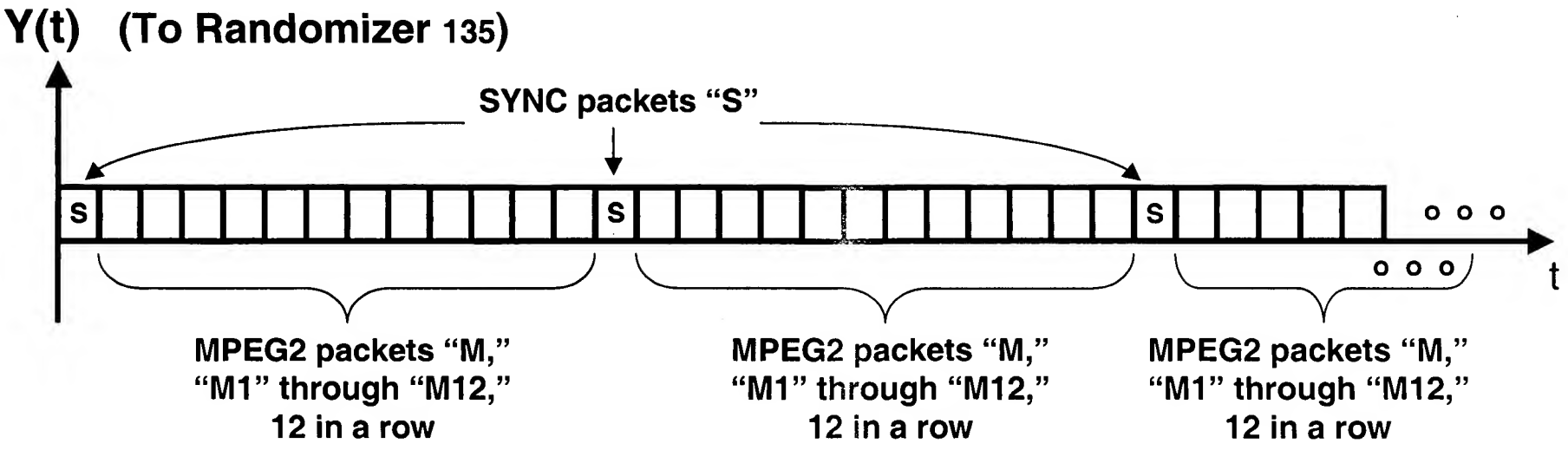


FIG. 13

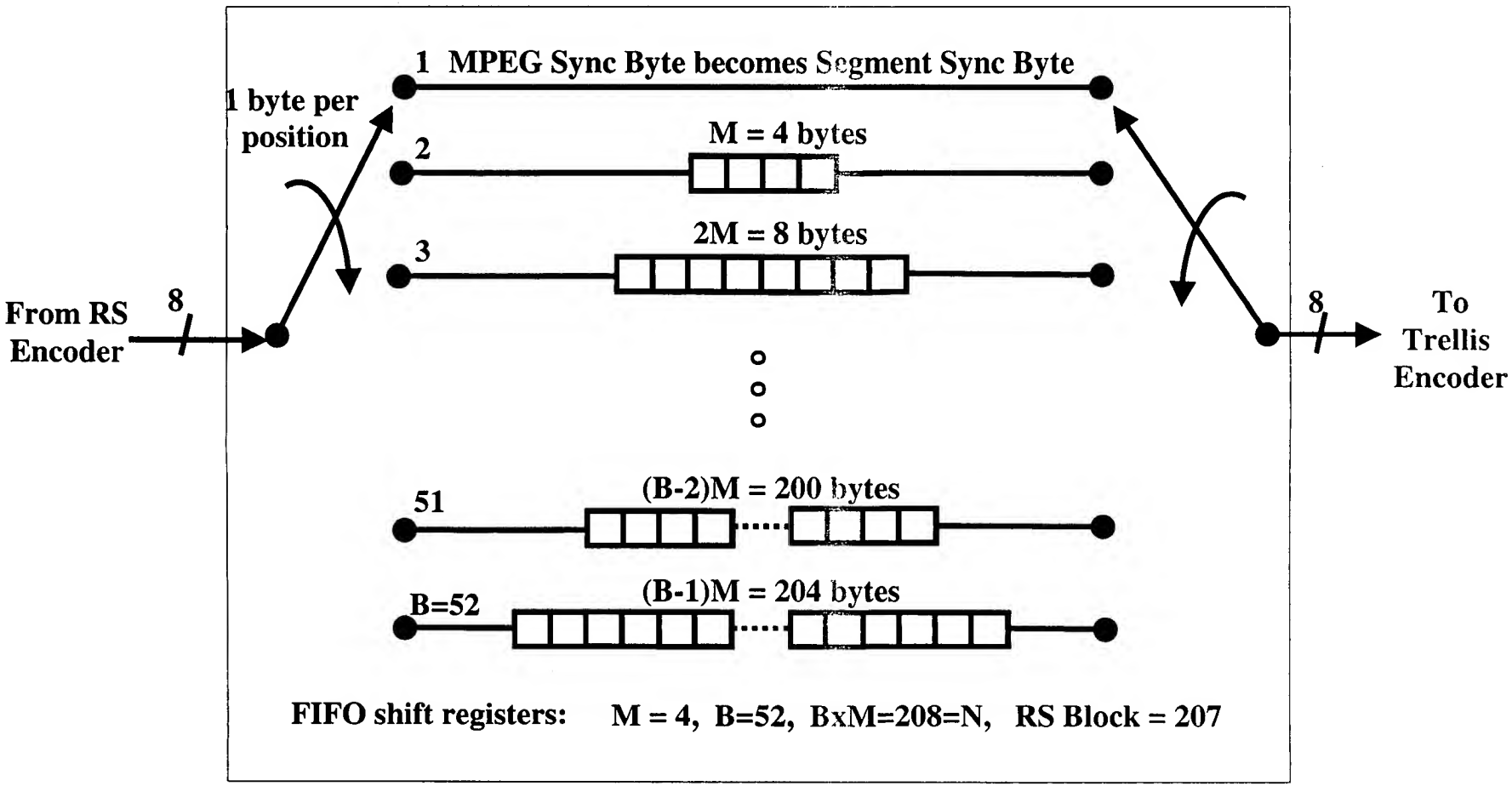

1 MPEG Sync Byte becomes Segment Sync Byte
1 byte per position
M = 4 bytes
2
2M = 8 bytes
3
From RS Encoder
8
8
To Trellis Encoder
51
(B-2)M = 200 bytes
B=52
(B-1)M = 204 bytes
FIFO shift registers: M = 4, B=52, BxM=208=N, RS Block = 207

FIG. 14

EXAMPLE: 1 PER 6

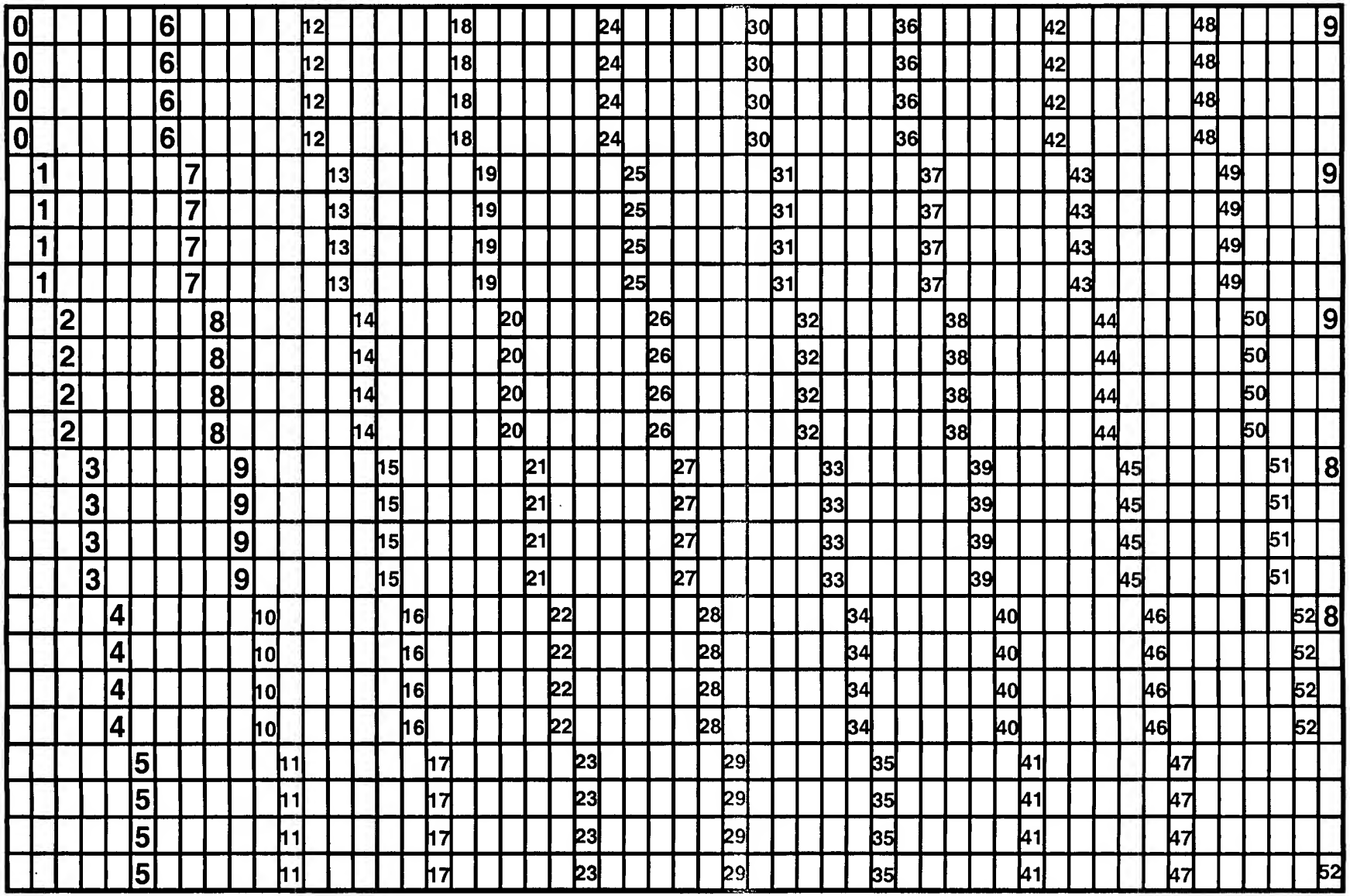


FIG. 15

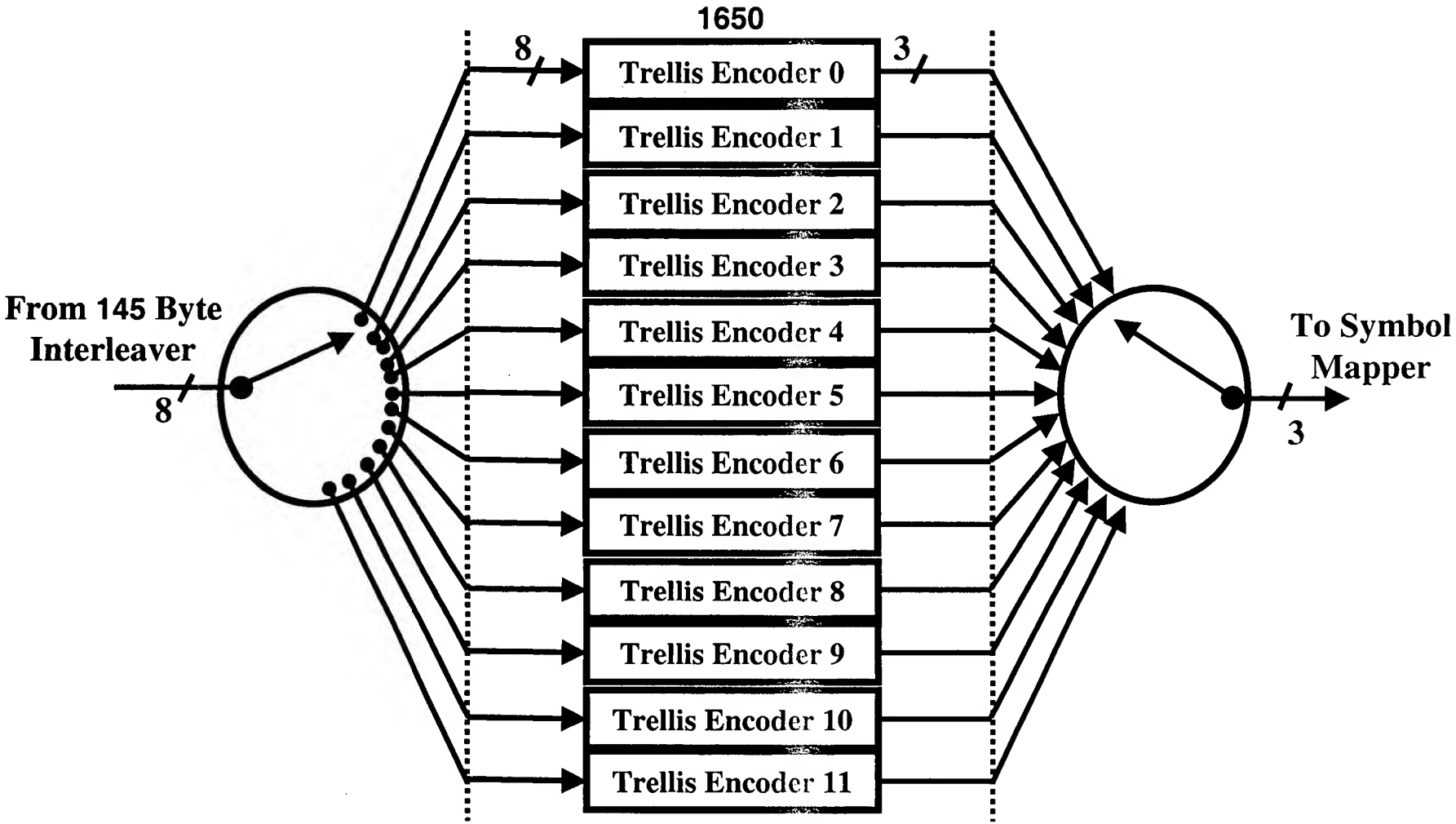

1650
8
3
Trellis Encoder 0
Trellis Encoder 1
Trellis Encoder 2
Trellis Encoder 3
Trellis Encoder 4
Trellis Encoder 5
Trellis Encoder 6
Trellis Encoder 7
Trellis Encoder 8
Trellis Encoder 9
Trellis Encoder 10
Trellis Encoder 11
From 145 Byte Interleaver
8
To Symbol Mapper
3

FIG. 16

TOC240" T84Q4860

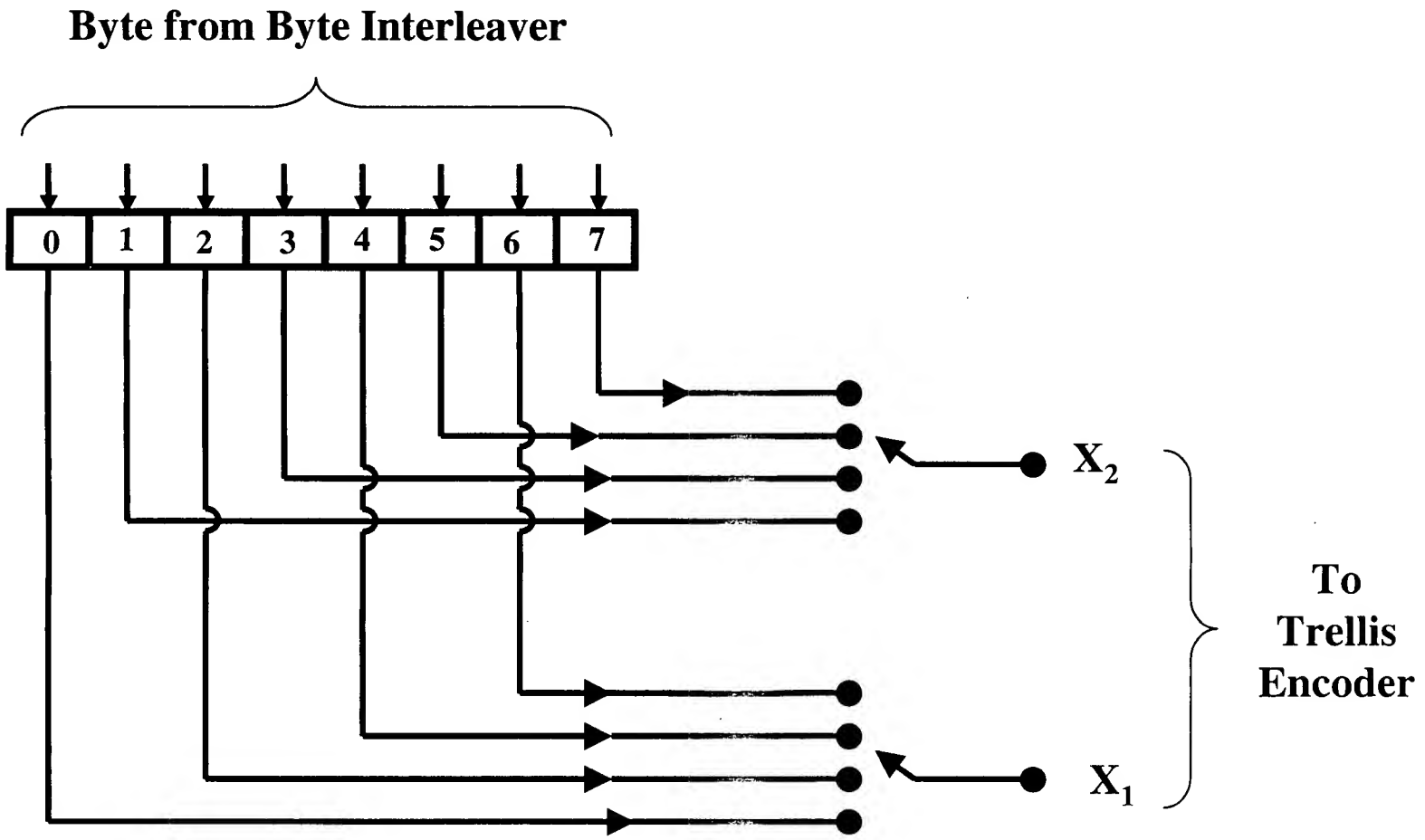


FIG. 17

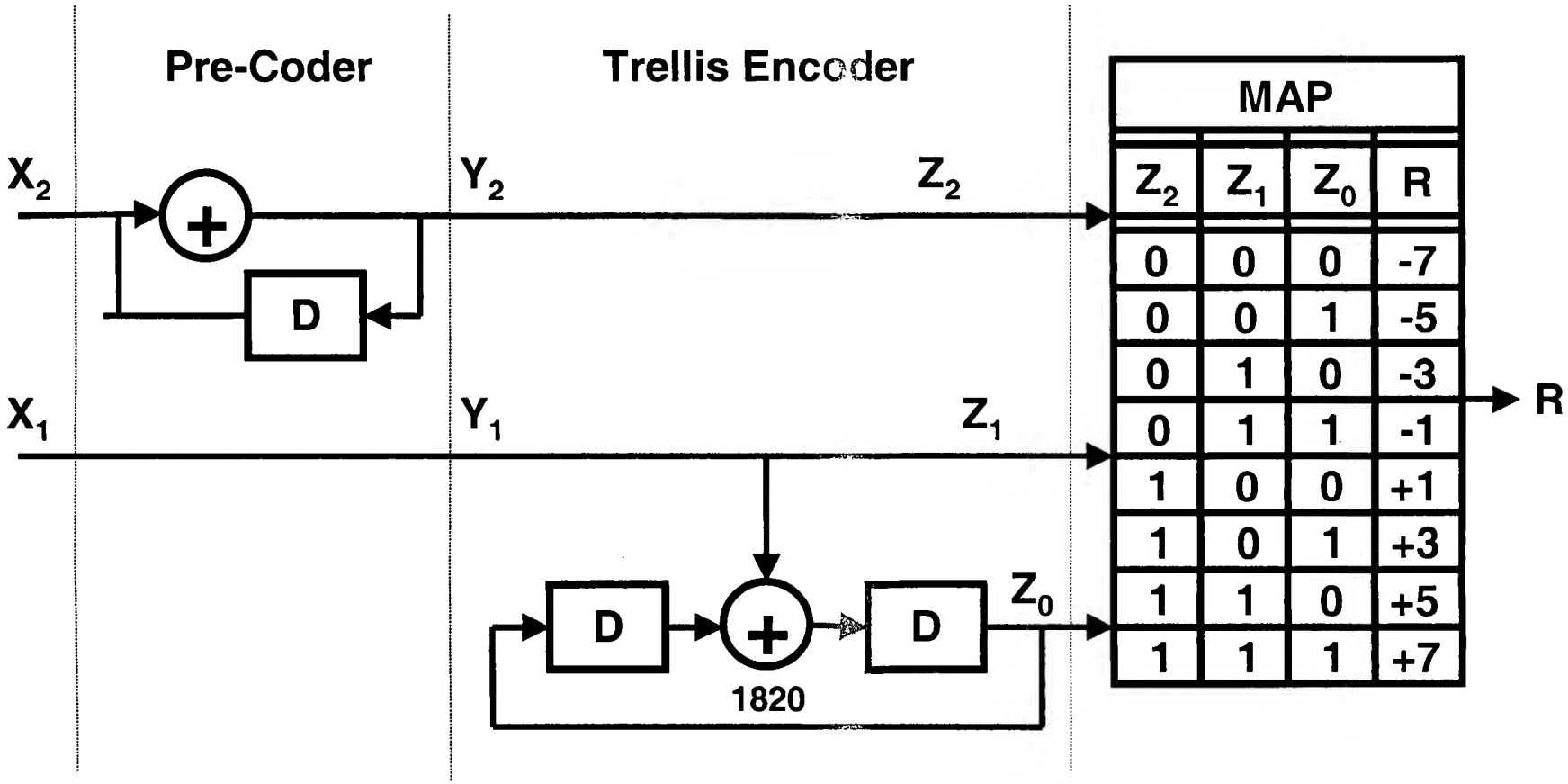

Pre-Coder
Trellis Encoder
X2
Y2
Z2
D
X1
Y1
Z1
D
D
Z0
1820
MAP
Z2 Z1 Z0 R
0 0 0 -7
0 0 1 -5
0 1 0 -3
0 1 1 -1
1 0 0 +1
1 0 1 +3
1 1 0 +5
1 1 1 +7
R

FIG. 18